# FACTORS INFLUENCING SUSTAINABILITY OF PUBLIC STREET LIGHT DEVELOPMENT PROJECTS IN NAIROBI CITY COUNTY, KENYA

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## ABSTRACT

Electricity is pervasive in all industrialized countries and largely absent in the developing world: about 1.6 billion people world-wide lack access to electricity. In recent decades, attempts have been made to increase project success and strengthen project management through a variety of tools. However, several community-based street lighting projects have been started and failed and others struggle to survive in Nairobi County. The purpose of the study was to evaluate factors influencing sustainability of public street light development projects in Nairobi City County. The objectives of the study were to establish the influence of technical longevity, stakeholder participation, technological attributes and project financing on sustainability of public street light development projects in Nairobi City County. A descriptive research design was applied in this study. The study was conducted at the Nairobi City County offices and the population of interest is the electrical department. The department is responsible for formulation of street lighting plans and installations as well as their maintenance. The respondents were all the eight engineers, all the twenty-five supervisors and technical employees in the electrical section of engineering department. The population also included contractors and community leaders (administrators). Stratified random sampling technique was used in coming up with a sample of 174 out of the total population of 319. Primary data was collected from the staff working at Nairobi City County using a self-administered semi structured questionnaire. Data was analyzed using descriptive statistics such as frequencies, percentages, mean score and standard deviation. In addition, multiple regressions were used to measure the strength of the relationship between the dependent and independent variables. Tables were used to present the data collected for ease of understanding and analysis. The study found that technical longevity, stakeholder involvement / participation, financing / funding and technological attributes influence sustainability of public street light development projects in Nairobi County. The study concluded that technical longevity having the greatest effect on sustainability of public street light development projects in Nairobi County followed by financing/funding then technological attributes while stakeholder involvement/participation having the least effect on sustainability of public street light development projects in Nairobi County. The study recommended that management team of Nairobi County Government should consider operation competency when initiating a project of Public street light development.


***Key Words:*** *technical longevity, stakeholder participation, technological attributes, project financing and stainability, public street light development projects*

## INTRODUCTION

Electricity is pervasive in all industrialized countries and largely absent in the developing world: about 1.6 billion people world-wide lack access to electricity (Letza & Sun 2012). Even though many would consider electricity to be a marker for development, and despite several historical episodes of wide-spread electrification in developed countries (for example, the rural electrification of America in the 1930s), we know little about the direct effects that new access to modern energy infrastructure will have on the process of development. 121 million people living in towns and cities in sub-Saharan Africa do not have access to electricity. Projects such as The Lighting Africa project have been designed to address the lighting needs of low-income households and businesses (Faull, 2004). The project was meant to offer a lighting alternative for low-income consumers who relied on kerosene lamps, candles or battery powered torches. The project also aimed to contribute to the realization of the Millennium Development Goals (MDGs) by reducing poverty and enhancing quality of life for low-income households (Saghir, 2005).

In addition, electricity is an essential commodity in the modern era for enjoying the quality of life, and at the same time, it is an indispensable input in economic and social development. Despite its importance, access to electricity is limited in many developing countries (Oda & Tsujita, 2011). Street lighting is one of the most important parts of a city's infrastructure where the main function is to illuminate the city's streets during dark hours of the night (Wambugu, 2014). Providing street lighting is one of the most important and expensive responsibilities of cities. Street lighting can account for 10 – 38% of the total energy bill in typical cities worldwide (NYCGP, 2009).

In recent decades, attempts have been made to increase project success and strengthen project management through a variety of tools. Examples include the sustainable livelihoods framework and project cycle management (DFID 2010). The frameworks seek to help practitioners understand the project process and consider issues which are important to sustainability. They have been adopted by governments and international development institutions such as DfID, UNDP, and Oxfam (CCI, 2010). The concepts have also been adapted to specific issues such as environment or gender in development (Sustainable Business, 2012).

Sustainability of these projects is crucial. In this case, sustainability means that once a project has been rolled out, it continues to work overtime (Clarke, 2008). More specifically for this research, it implies the ability to recover from technical breakdown in the scheme. Built into common conceptions of the term are notions of minimal external support, national and county government financing and the continuation of a beneficial service over time (Jones, 2012). It is estimated that 35% of all street lighting projects in sub-Saharan Africa are not functioning (Baumann, 2005), and despite the frequency with which it appears in development discourse, the reality of sustainability remains elusive.

Sustainability pertains to a multiple of aspects with institutional, social, technical, environmental and financial dimensions (Akaki, 2009). This accounts for the fact that

understanding and measuring sustainability is so difficult, and why solutions are highly context specific. Practical responses to the challenge of sustainability are being tested and used by development practitioners the world over. Due to the widespread trend in developing countries of the devolution of responsibility for street lighting projects from governments to urban areas, many of the interventions aimed at improving sustainability are taking place at the city level. The use of appropriate technologies which are low cost, easy to maintain, simple to use and readily available is one response to the challenge of sustainability (Bastakoti, 2009).

During the year 1807, gas derived from coal was used to light the Westminster Bridge in London. Baltimore became the first American city to have its streets lit up in 1816 using this primeval model. Modern street lights, as we know them today, were first put up in Paris (City of Lights) with actual electric arc lamps lining the streets. Arc lights had two major disadvantages. Firstly, they emitted an intense harsh yellow light which caused light pollution and secondly, they were maintenance intensive as the lamps required constant replacement. In 1879, incandescent light bulbs were invented. The first street to be lit with the new technology was Newcastle, England. Africa experienced its first street lights in 1882 at Kimberly, South Africa (Kenya Power Company, 2014).

As innovations into street lighting progressed, high-intensity discharge lamps were invented and are still commonly used for today's lighting needs. Street lights are made up of a number of features. Firstly, a structural system consisting of poles and the pole's foundation; secondly, the electrical system consisting of ballasts and service cabinets (fuse box); and lastly, the optical system made up of a luminaire (New York City Global Partners, 2011).

The most common reasons for inefficient street lighting systems include; selection of inefficient street lamps, poor design and poor maintenance practices (Mandri-Perrott, 2012). Existing street lights can be retrofitted or replaced to increase energy efficiency. To retrofit is to add a component or accessory to something that already exists. The decision to retrofit or to replace new street lights should be based on the purpose and lighting requirements of the roadway, age of existing lighting infrastructure and whether existing poles can be used with replacement of luminaires or new poles have to be put up (New York City Global Partners, 2011).

The Kenya government has made efforts to create an enabling environment for development by improving infrastructure (roads, electricity, IT, communications, water, market access) which provide opportunities to poor people and their communities (International Monetary Fund (IMF), 2008). The first electricity supplying company in Nairobi was the Nairobi Power and Lighting Syndicate (NP&LS) founded in the year 1908 by Clement Hertzel. The company merged with Mombasa Electric Power and Lighting Company (MEP&LC) to form the East African Power and Lighting Company (EAP&L) which had exclusive rights to supply electricity in Kenya. In 1954, the Kenya Power Company (KPC) was created with the Kenyan government's partial ownership– to be managed by EAP&L. EAP&L was renamed Kenya Power and Lighting Company Limited (KPLC) in 1983 (Kenya Power Company, 2014).

Nairobi's first street lights consisted of oil lamps, with extremely inefficient lighting as there was no electricity supply. The first modern street lighting project in Nairobi was done in 1910. One major opportunity that economical usage of energy in street lighting can grant to Kenya is the achievement of Vision 2030. The economic pillar of the Vision 2030 targets the tourism, agriculture, IT manufacturing, wholesale/retail trade, and financial services which require sufficient energy to run effectively and efficiently (Wambugu, 2014).

According to Un-Habitat (2015), Informal settlements are home to more than 60% of Nairobi's population. They are generally described as havens of crime lacking modern energy, sanitation and other social amenities. There is strong evidence linking poor lighting to high levels of crime and insecurity as a result of which many commercial and productive activities in informal settlements stop at nightfall (Kenya Power and Lighting, 2014). The Adopt a Light Slum Lighting project had the objective of lighting public spaces in informal settlements in Nairobi in order to improve security and make them safer for residents. The main force behind the project was Adopt a Light Limited an advertising company headquartered in Nairobi. Project partners included the Nairobi City Council, the Kenyan Parliament through the Constituency Development Fund, private sector companies and the communities in the informal settlements targeted by the project. A total of 33 high light masts were installed in informal settlements in Nairobi including Kibera, Mathare, Korogocho, Huruma, Kawangware and Kangemi. The masts served in excess of 500,000 people in 150,000 households (Mwangi, 2012). An evaluation of the project conducted by Ipsos Synovate Kenya Limited concluded that in addition to improving neighborhood security, the project had succeeded in providing a conducive environment for productive economic activities. Business hours had increased within the lit areas. Fewer cases of mugging and harassment were recorded in the lit areas compared to unlit areas (Un-Habitat, 2015).

## STATEMENT OF THE PROBLEM

Lighting accounts for about 17.5% of global electricity use with the largest share used in commercial and public buildings, followed by residential lighting, industrial sector lighting and outdoor/street lighting (The Climate Group, 2012). Street lighting is viewed as a social facility which is a key indicator of the comparative socio-economic development position of a country. It contributes to improved road safety for pedestrians and drivers alike; it reduces criminal activities in the cities and towns. Streetlights also play an important role in improving the general business and living climate of urban and peri-urban areas (Baumann, 2005). Several community-based street lighting projects have been started and failed and others struggle to survive in Nairobi County (Magutu, 2010). Such development projects include street lighting installation at Kangundo Road which was completed after a long time but some of the lights never worked while some have already been vandalized high masts at Kahawa West and security lighting installation at Githurai Ward were initially working but at present some do not work. Public lighting installation at Kangemi and Kawangware were successfully installed but left idle due to standoff between the government and Kenya power company (Wambugu, 2014). Other projects such as Nile Road street lighting was awarded, however, the contractor had not yet reported on site two years later. Similarly, the high mast

security light at Central Park which was meant to provide reduced acts of crime was successfully completed but no longer in use (Wafula, 2013). In addition street light project in Roysambu area, three years later the contractor is yet to possess site. Similarly, Public street lighting at Laini Saba in Kibera was completed and county government is awaiting letter of discharge from contractor, however, some of the posts have already been knocked down. Lack of training, low support by community development officials and lack of community involvement, insufficient funds, poor management and lack of coordination are some of the reasons put forward for the failure of these projects (Wambugu, 2014). King'ara (2006) conducted a study on procedural fairness and the privatization of public services: a case study of the street lighting contract between Nairobi City Council and Adopt-a- Light Limited, Rukwaro (2006) researched on urban street design and standards in architecture while Wambugu (2014) conducted a study on formulation and implementation of operations strategy for energy-efficient street lighting: the case of Nairobi City County. However, none of the researchers has considered factors influencing sustainability of public street light development projects in Nairobi County. This study therefore sought to establish the factors that influence sustainability of public street light development projects in Nairobi County.

## PURPOSE OF THE STUDY

The purpose of the study was to evaluate factors influencing sustainability of public street light development projects in Nairobi City County.

## SPECIFIC OBJECTIVES

1. To assess the influence of technical longevity on sustainability of public street light development projects in Nairobi City County.
2. To evaluate how stakeholder participation influences sustainability of public street light development projects in Nairobi City County.
3. To determine the influence of technological attributes on sustainability of public street light development projects in Nairobi City County.
4. To establish the influence of project financing on sustainability of public street light development projects in Nairobi City County.

## THEORETICAL FRAMEWORK

A theoretical framework is a group of related ideas that provides guidance to a research project or business endeavor (Zima, 2010). The study was anchored on the diffusion technology theory supported by constraints management theory and instrumental stakeholder theory.

### Diffusion Technology Theory

According to Basu, Fernald and Shapiro (2010) most cross-country differences in per capita output are due to differences in total factor productivity (TFP), rather than to differences in

the levels of factor inputs (Basu, Fernald & Shapiro, 2010). The studies concluded that these cross-country TFP disparities can be divided into two parts: those due to differences in the range of technologies used and those due to non-technological factors that affect the efficiency with which all technologies and production factors are operated. In order to advance its technology, a firm must make an investment. The size of the investment depends on the size of the technology adoption barriers in the firm country.

Technological diffusion is the process by which innovations (new products, new processes or new management methods) spread within and across economies. According to Parente & Prescott (2011), most industry studies suggest that the adoption of a new technology requires investment in capital, with a substantial fraction taking the form of investment in intangible capital (Parente & Prescott, 2011). A poorer country has the potential to realize large increases in productivity once the institutional arrangements of that country change so as to allow individuals to keep more of the returns on their investments, and these new institutional arrangements are expected by individuals to survive into the future. This is because poorer countries are most likely to adopt technologies that already have been successfully adopted in richer countries. Consequently, poorer countries will have available to them more information of what to do for successful adoption.

## Constraints Management Theory

The roots of CM can be traced to the development of a production scheduling software package known as Optimized Production Technology (OPT) in the late 1970s. Since then, CM has evolved from a manufacturing scheduling method to a management philosophy that can be used to understand and improve the performance of complex systems. Eliyahu Goldratt, the founder of CM, claimed that it is a theory of managing manufacturing organizations (Fellows, 2008). Love (2005) argues that the scientific methods of CM have provided a theory to communicate and enhance organizational performance. Although aspects of the theory of CM have been made explicit (Wambugu, 2014), underlying constructs of CM have not been identified. Brian (2013) argued that if CM is to be accepted as a general theory, then the theory must be empirically developed and tested. In essence, the theory says that the higher the degree of throughput orientation, the greater organizational performance will be. The three dimensions of throughput orientation are organizational mindset, performance measurement systems, and decision making. Companies that are high on all three dimensions would be expected to have better performance than companies that are low on one or more of the dimensions.

## Instrumental Stakeholder Theory

The origin of the stakeholder concept lies in the business science literature (Freeman, 1984), and may be traced back even as far as Adam Smith and is The Theory of Moral Sentiments. Its modern utilization in management literature was brought about by the Stanford Research Institute, which introduced the term in 1963 to generalize and expand the notion of the shareholders as the only group that management needed to be sensitive towards (Jongbloed et

al., 2008). Within this perspective, Freeman (1984) argued that business organizations should be concerned about the interests of other stakeholders when taking strategic decisions. Although a relatively longstanding term, the development of stakeholder theory was set in motion by the work of Freeman (1984). The objective of his work was to delineate an alternative form of strategic management as a response to rising competitiveness, globalization and the growing complexity of company operations. As time went by, the stakeholder concept has taken on greater importance due to public interest, greater coverage by the media, concerns about corporative governance and its adoption as a policy within the scope of the Third Way (Hutton, 1999; Greenwood, 2008).

However, despite the countless definitions and differing emphasizes, which may result in distorted conceptual interpretations (Friedman and Miles, 2006), a large majority of studies adopt the definition idealized by Freeman (1984) that individuals or groups may influence or be influenced by the scope of organizational objectives. Within this concept, a person, an informal group, an organization or an institution may all be stakeholders. Mitchell et al. (1997) state that the Freeman (1984) definition is so broad that it opens up an infinite scope for stakeholders as even climatic factors may play this role. Hence, there is a need to establish limits to the extent of stakeholders. To this end, Freeman and Evan (1990) reduce the organizational environment to a multilateral agreement between an organization and its stakeholders.

## RESEARCH METHODOLOGY

### Research Design

A descriptive research design was applied in this study. Descriptive research gives researchers the opportunity to use both quantitative and qualitative data in order to find data and characteristics about the population or phenomenon that is being studied (Mugenda & Mugenda, 2003). The data collection for descriptive research presents a number of advantages since it can provide a very multifaceted approach using interviews, observations, questionnaires and participation.

### Population of the Study

The study was conducted at the Nairobi City County offices and the population of interest is the electrical department. The department was responsible for formulation of street lighting plans and installations as well as their maintenance. The respondents were all the eight engineers, all the twenty-five supervisors and technical employees in the engineering department. The population also included contractors and community leaders (administrators).

## Sampling Procedures

A sample population of 174 was arrived at by calculating the target population of 319 with a 95% confidence level and an error of 0.05 using the formula taken from Kothari (2004). The study selected the respondents using stratified proportionate random sampling technique.

## Data Collection Instruments

The primary research data was collected from the management staff working at Nairobi City County using a self-administered semi structured questionnaire. Secondary data was collected from the Nairobi City County records, including the Workbook and Service Charter Manual and was used to supplement primary data as well as to give insights into current developments towards sustainability of street lighting.

## Data Collection Procedure

On the primary data, questionnaires were used to collect data. The researcher administered the questionnaire individually to all respondents. Care and control by the researcher was exercised to ensure all questionnaires issued to the respondents was received. To achieve this, the researcher maintained a register of questionnaires, which was sent and received. The questionnaire was administered using a drop and pick later method to the sampled respondents.

## Data Analysis Techniques

The returned questionnaires were checked for consistency, cleaned, and the useful ones coded and analyzed using the Statistical Package for Social Sciences (SPSS version 21) computer software. A descriptive analysis was employed such as means, standard deviation and frequency distribution. The quantitative data was measured in real values by normalizing. In addition, multiple regression was used to measure the strength of the relationship between the dependent and independent variables. The regression equation was:

$$\mathbf{Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \alpha}$$

Where: Y is Sustainability of public street light development projects; $\beta_0$ is the regression coefficient/constant/Y-intercept; $\beta_1$, $\beta_2$, $\beta_3$, $\beta_4$ are the slopes of the regression equation; $X_1$ is the Technical Longevity independent variable; $X_2$ is the Stakeholder Participation independent variable; $X_3$ is the Technological attributes independent variable; $X_4$ is the Financing attribute independent variable; $\alpha$ is an error term

## RESEARCH RESULTS

In addition, the researcher conducted a multiple regression analysis so as to test relationship among variables (independent) on sustainability of Public Street light development projects in Nairobi County. The researcher applied the statistical package for social sciences (SPSS V 25.0) to code, enter and compute the measurements of the multiple regressions for the study.

**Table 1: Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error |
|---|---|---|---|---|
| 1 | 0.854 | 0.729 | 0.720 | 0.963 |

The adjusted $R^2$ was found to be 0.720 inferring that variations on sustainability of public street light development projects in Nairobi County which are explained by technical longevity, stakeholder involvement/participation, financing/funding and technological attributes were 72% which implies that the other remaining 28% was explained by other uncovered factors in this study that affect sustainability of public street light development projects in Nairobi County.

**Table 2: ANOVA**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 302.34 | 4 | 75.585 | 79.549 | .000 |
| | Residual | 112.12 | 118 | 0.950 | | |
| | Total | 414.46 | 122 | | | |

In predicting the effects of technical longevity, stakeholder involvement/participation, financing/funding and technological attributes on sustainability of public street light development projects in Nairobi County, the regression model test was found to be significant since p-value was less than 0.05 and the calculated F (79.549) was larger than the F critical value of 2.446. This implies that the regression model was significant.

**Table 3: Regression Coefficients**

| Model | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|
| | B | Std. Error | Beta | | |
| (Constant) | 0.929 | 0.212 | | 4.382 | .000 |
| Technical longevity | 0.872 | 0.298 | 0.671 | 2.926 | .004 |
| Stakeholder involvement/participation | 0.617 | 0.227 | 0.541 | 2.718 | .008 |
| Financing/funding | 0.728 | 0.294 | 0.654 | 2.476 | .015 |
| Technological attributes | 0.661 | 0.228 | 0.568 | 2.899 | .005 |

The established model for the study was:

$$Y= 0.929+0.872X_1 + 0.617X_2 + 0.728X_3 + 0.661X_4$$

The results reveal that sustainability of public street light development projects in Nairobi County will be 0.929 if all other factors are held constant. The study results also show that an increase in technical longevity will lead to a 0.872 increase in sustainability of public street light development projects in Nairobi County if all other factors are held constant. Again, as shown by r=0.617, the study reveals that increase in stakeholder involvement/participation would lead to an increase in the sustainability of public street light development projects in Nairobi County if all other factors are held constant. Further the study showed that if there was a unit change in financing/funding, a 0.728 increase in the sustainability of public street light development projects in Nairobi County would be realized if all other factors are held constant. Also, a unit change in technological attributes would lead to 0.661 increases in the Sustainability of public street light development projects in Nairobi County if other factors were constant.

Finally, the study showed that all variables were significant since p-values were less than 0.05 with technical longevity having the greatest effect on sustainability of public street light development projects in Nairobi County followed by financing/funding then technological attributes while stakeholder involvement/participation having the least effect on sustainability of public street light development projects in Nairobi County.

## DISCUSSION OF THE FINDINGS

The findings for influence of influence of technical longevity, stakeholder involvement/participation, financing/funding and technological attributes on sustainability of public street light development projects in Nairobi County are discussed in this section by linking them to literature.

### Technical Longevity

The study found that technical longevity influence sustainability of public street light development projects in Nairobi County. The study established that project maintenance and repair, monitoring of the project, operators competence and structural systems greatly influence sustainability of public street light development projects in Nairobi County. The study also found that electrical systems lowly influence sustainability of public street light development projects in Nairobi County. These findings are in line with Herring (2014) who argues that modern technology practices on public street lighting projects saves significant levels of energy and costs making such elements stay for a long period and sustaining the projects especially when costs are kept low and manageable. This is able to improve urban safety on street lighting projects hence enabling an appealing atmosphere worth living in, and sustainably reduces CO2 emissions.

### Stakeholder Involvement/Participation

The study found that stakeholder involvement/participation influence sustainability of public street light development projects in Nairobi County greatly. The study established that feasibility study, capacity building and management committee greatly influence sustainability of public street light development projects in Nairobi County. The study also revealed that labour provision moderately influence sustainability of public street light development projects in Nairobi County. These findings are supported by Michener (2008) who reported that development actors believe that participation rescues the development industry from being top-down, paternalistic, and dependency-creating. In addition, Michener (2008) suggested that urban development actors should facilitate primary stakeholders towards enhancing participation, empowerment and ownership of the development interventions for their sustainability.

### Financing/Funding

The study found that financing/funding greatly influence sustainability of public street light development projects in Nairobi County. Further, the study found that sources of funds, development agencies and donor funds influence sustainability of public street light development projects in Nairobi County greatly. The study also found that partnerships influence sustainability of Public Street light development projects in Nairobi County moderately. These findings are in line with Hager (2015) who argues that it is important to have a financing strategy with several different sources of income as opposed to relying on just one or two donors. Having multiple sources of funds allows flexibility and a country can choose and change the projects it wants to run if it can comfortably finance using internally generated funds.

### Technological Attributes

The study found that technological attributes greatly influence sustainability of public street light development projects in Nairobi County. The study established that type of lamp used, innovations and improvement and L.E.D technology greatly influence sustainability of Public Street light development projects in Nairobi County. The study found that solar streetlights moderately influence sustainability of Public Street light development projects in Nairobi County. These findings conforms to Terry (2007) who says technology simplifies and reduces task needing manual skill and strengths especially in factories and either forms of production property applied can increase productivity. The level of technology employed significantly influences the completion and effectiveness of rural electrification projects.

## CONCLUSIONS

The study concluded that technical longevity influence sustainability of public street light development projects in Nairobi County significantly. Some of the factors contributing to this influence were found to be project maintenance and repair, monitoring of the project, operators competence and structural systems. These had a great influence on sustainability of public street light development projects in Nairobi County.

In addition, the study concluded that influence sustainability of public street light development projects in Nairobi County greatly and significantly. The study established that feasibility study, capacity building and management committee are some of identified factors leading to a great influence sustainability of public street light development projects in Nairobi County.

Further the study concluded that financing/funding greatly and significantly influence sustainability of public street light development projects in Nairobi County. Some of the factors having great and significant influence on sustainability of public street light development projects in Nairobi County were found to be sources of funds, development agencies and donor funds and partnerships.

The study also concluded that technological attributes greatly and significantly influence sustainability of public street light development projects in Nairobi County. The study revealed that type of lamp used, innovations and improvement and L.E.D technology greatly influence sustainability of Public Street light development projects in Nairobi County. The study found that solar streetlights moderately influence sustainability of Public Street light development projects in Nairobi County.

## RECOMMENDATIONS

The study recommended that management team of Nairobi County Government should consider operation competency when initiating a project of Public street light development. This aspect of operation competence would enable the management team to assess experience of project teams brought on board.

The project stakeholders of the Nairobi County should also consider product reliability of the street light components since these had a significant effect on the sustainability. Furthermore, the management should establish a strong monitoring team with responsibility of monitoring the performance of the street light in order to establish and identify those which failed or about to fail and make replacement before they failed completely, as shown by effects of maintenance and repair.

The study further recommended that that the County Government of Nairobi should form a competent committee with task of determining the project requirements. The committee should develop a plan on how the project would be introduced, implemented and properly managed. The committee would also come up with a budget or cost of the project as well as

labour requirements. Capacity building should also be done to enhance efficiency of the project. This would enhance sustainability of street light development project.

The study also recommends that there is a need for innovations and improvement in Public Street light development projects. This can be done through coming with strategies to ensure that the initiated Public Street light development projects are sustained for as long as possible. Use of LED lamps and introduction of high-intensity discharge lamps would improve Public Street lighting.

The study recommends that county government should limit overdependence on donor funds and indeed focus on establishing income generating activities and venture into multiple sources of funds for their projects. This would improve their financial sustainability. In addition, the county government should diversify their funding base and should try to strike a balance between internally generated and external funding. To mitigate against the uncertainty surrounding external donor funding.

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